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Hybrid Striped Bass

Biology and Life History

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Hybrid striped bass generally refers to a cross between striped bass (*Morone saxatilis*) and white bass (*M. chrysops*). This cross, sometimes called the "original cross," was first produced in South Carolina in the mid-1960s using eggs from striped bass and sperm from white bass. The accepted common name of this cross is the Palmetto Bass. More recently the "reciprocal" cross using white bass females and striped bass males was also produced. The accepted common name of this cross is the Sunshine Bass. Hybrid striped bass have gained widespread acceptance as a sportfish, particularly in the large reservoirs of the southeast U.S., where it was stocked because of the large forage base provided by gizzard shad and threadfin shad.

Striped bass and hybrid striped bass, in particular, have potential for culture in the United States as foodfish. Other *Morone* species have since been hybridized with striped bass but none has gained the acceptance of the striped bass by white bass cross, either as a sportfish or as a culture species.

The genus *Morone* belongs to the family Percichthyidae of the order Perciformes. Four species of *Morone* are found in the United States. Two species, white bass and yellow bass (*M. mississippiensis*) are found in freshwater. Striped bass are anadromous, but landlocked populations can be found in some freshwater reservoirs. White perch (*M. americana*) is a brackish water species but also does well in freshwater lakes and reservoirs. Three other marine species belong to the family Percichthyidae.

Distribution

Striped bass was originally found on the Atlantic Coast from New Brunswick to Florida and along the Gulf Coast from Florida to Texas. It was introduced to the west coast in the early 1890s and established reproducing populations. On the Pacific coast striped bass now range from British Columbia to south of the border between the United States and Mexico. Landlocked populations exist in many reservoirs throughout the United States where inflowing stream conditions meet striped bass spawning requirements. Striped bass populations are maintained by stocking programs in many reservoirs throughout the United

States where striped bass do not reproduce.

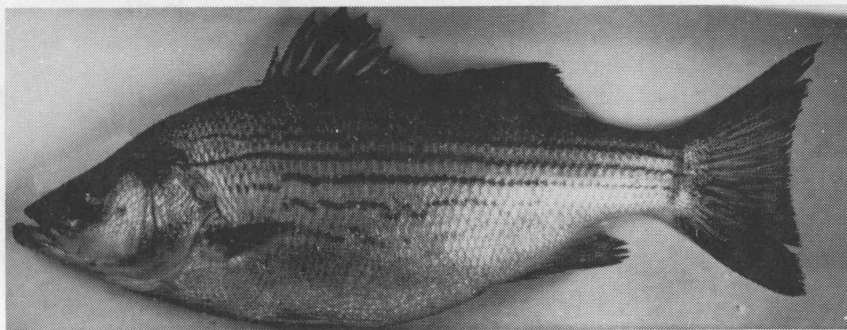
The species is anadromous and considered an excellent food and game fish sometimes reaching over 70 pounds. Commercial harvest of striped bass has declined drastically since 1973 when a harvest of nearly 15 million pounds was recorded. Now, less than a million pounds per year are harvested commercially, and commercial and sportfishing for striped bass is prohibited or strictly regulated.

White bass was originally distributed throughout most of the Mississippi basin and along the Gulf Coast and has since been widely introduced throughout the country for recreational fishing, particularly in large reservoirs. Although smaller than striped bass, the white bass is a popular food and game species in many areas, reaching a size of 4 to 5 pounds.

Physical characteristics

The appearance of hybrid striped bass is intermediate to that of the parental species. The body is slightly compressed in cross-section and scaled. Lateral stripes similar to those of the striped bass are present,

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Hybrid striped bass (striped bass x white bass).

but the stripes are generally broken in the area behind the pectoral fin and below the lateral line. The fish has two dorsal fins, a spinous dorsal fin near the center of the body contains 8-9 spines and a soft-rayed fin behind that contains 1 spine and 13-14 rays. The two dorsal fins are not connected by a membrane. The caudal fin is forked and the two lobes are pointed. The anal fin has three spines and 9-13 soft rays. The general color of the fish grades from silver and black dorsally to white underneath. The shade depends on the color of the water. Young hybrids have visible parr marks on their sides until they are several inches long.

Habitat

Hybrid striped bass are stocked into a variety of water types for recreational purposes. They do well in slow moving streams, large reservoirs, lakes and ponds. They are seldom found in extremely shallow areas or areas that contain dense growth of aquatic weeds. Because they are pelagic in nature they are generally found in open water areas. They are generally most active during periods of low light such as dawn and dusk. Beginning in late winter they tend to concentrate in deep areas near inflowing streams and in the spring may undergo spawning migrations into upstream areas. Hybrids are fertile and there are reports of successful reproduction in a few reservoirs.

Water quality

Hybrids survive and do well in a wide range of environmental conditions. A temperature range of 4 to 33° C is acceptable, but optimum growth occurs within a temperature range of 25 to 27° C. Hybrids are generally stocked into freshwater systems but they do well in salinities of 0 to 25 ppt, and some can survive salinities up to full strength seawater (35 ppt). Dissolved oxygen levels as low as 1 mg/l can be tolerated for a short period of time, but optimum dissolved oxygen levels range from 6 to 12 mg/l.

Hybrid striped bass are stocked into a variety of water quality situations with regard to alkalinity, hardness and pH. Alkalinity values of 100 mg/l or above are preferred but levels less than 20 mg/l are suitable. Hardness and alkalinity are usually related and similar values could be given for hardness. A pH range of 7.0 to 8.5 is optimum for growth, but a much wider range is tolerated. Hybrids in culture ponds have survived repeated exposure to a pH of 2.5 for short periods of time.

Feeding

Hybrid striped bass is a predaceous species throughout its life. Fish less than approximately 50 mm feed primarily on crustacean zooplankton such as cladocerans and copepods. Insects of various types and zooplankton continue to be a major part of the diet until the fish are 100 to 125 mm long. Hybrids switch to fish diet at a very small size if appropriate sized fish are available.

However, this transition usually occurs when the hybrids are larger than 100 mm. Threadfin shad and gizzard shad are the most common fish prey species. However, many species of forage fish have been found in stomachs of hybrids. There is seasonal variation in feeding habits with a shift towards larger organisms in the winter and summer.

Age and growth

Hybrid striped bass grow when water temperatures are above 15° C. However, optimum growing conditions occur when water temperatures are 25 to 27° C. Hybrids grow rapidly during their first two years of life. Growth to 275 to 375 mm in length and 225 to 350 grams in the first year and 450 to 550 mm in length and 1 to 1.5 kg in the second year is common. Growth rate declines rapidly with increasing age and is similar in males and females. Maximum reported weight for a hybrid striped bass is approximately 10 kg. The typical size of hybrids caught by fishermen generally ranges from 2 to 5 pounds, but fish in the 10 to 15 pound range are not uncommon. The usual life span of hybrid striped bass is 5 to 6 years--more similar to white bass than to striped bass (30 to 40 years).

The growth rate of hybrid striped bass in production ponds is determined by several factors: water temperature, quality and quantity of food, palatability of food, frequency of feeding and water quality. Hybrid striped bass are generally harvested at a weight of 1.5 to 2.5 pounds when they are 18 to 24 months old.

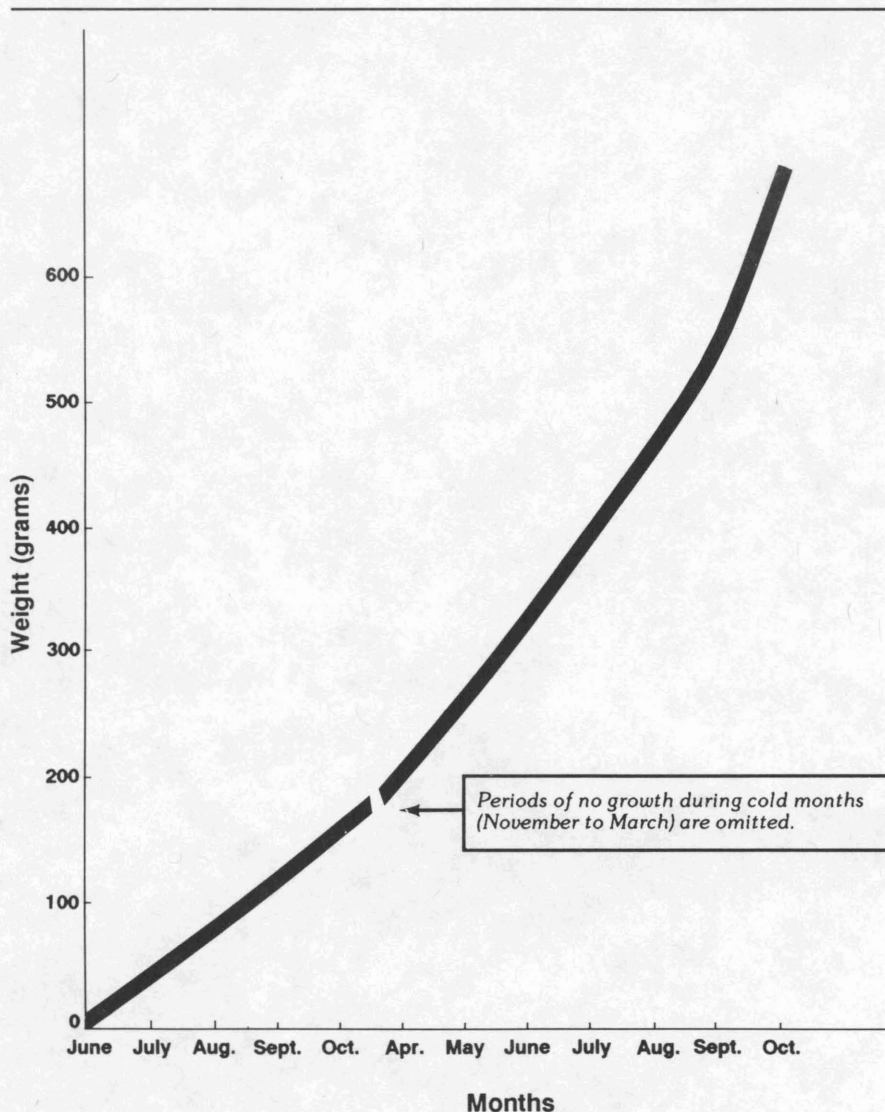


Figure shows increase in weight through two growing seasons of hybrid striped bass x white bass under culture conditions. (From UNC Sea Grant research.)

Spawning

Hybrid striped bass, unlike some other hybrids, is fertile. It is oviparous (egg-laying) like the parental species and produces eggs and sperm in the spring when temperatures are 15 to 20° C. Some males mature at the age of 1 year (approximately 250 mm long and 500 grams), and all are mature at 2 years of age. A few females are mature at 2 years of age, but all are mature at 3 years. Females produce an average of 160,000 eggs per pound of body weight and spawn once a year. Males may spawn many times over the spawning season.

Natural spawning of hybrids has been verified in a few instances. They may participate in spawning runs with striped bass or possibly white bass. There are also confirmed cases of reproduction in reservoirs that contain only hybrid striped bass. Hybrid striped bass produce sperm and eggs during the spring when water temperature is between 55 to 70° F. Temperatures of 65° to 68° F are ideal for spawning hybrids and the parental species. Spawning occurs from mid-March through May depending on location. Spawning season in any one location usually lasts 4 to 5 weeks. Hybrids have been observed participating in spawning acts in areas that contain clear shallow rocky shoals that are 1 to 3 feet

deep. Females come to the surface during the spawning act and several males accompany her. The males appear to bump and butt the female which may stimulate egg release. Released eggs are immediately fertilized by the males.

The eggs of striped bass x white bass hybrids are intermediate in size to those of the parental species. They are semi-buoyant like striped bass eggs, although they seem to be heavier than striped bass eggs. Eggs of this cross are generally not adhesive like white bass eggs and must be buoyed up by the turbulent water flow till they hatch. Other hybrid crosses such as striped bass x white perch have adhesive eggs.

Eggs hatch in approximately 2 days at water temperatures of 65° to 68° F. At colder temperatures eggs may take over 72 hours to hatch. Newly hatched fry do not have fully developed mouth parts and do not feed until they are approximately 5 days old. During this swim-up stage the relatively large oil droplet is used as a food source.

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